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A Reconnaissance Survey Of Truncate Lake # 3

M. J. Hunter
March 1997

PWFWCP Report No. 152

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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105-02094/

A RECONNAISSANCE SURVEY OF

UNNAMED LAKE (TRUNCATE LAKE # 3)

WATERSHED:	**Finlay River**
DATE OF SURVEY:	**August 8,1996**
FIELD CREW LEADER:	**Mark Hunter**
FIELD ASSISTANT:	**Karin Mathias**
REPORT PREPARED BY:	**Mark Hunter**

BRITISH COLUMBIA CONSERVATION FOUNDATION

PEACE / WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

B. C. MINISTRY OF ENVIRONMENT, LANDS AND PARKS

FUNDED BY: FOREST RENEWAL BRITISH COLUMBIA

RELEASED BY: _____

D. J. Cadden, Regional Fisheries Biologist

LAKE: Unnamed Lake (Truncate Lake # 3) SYSTEM NAME: Finlay River

A.S.A.P. REFERENCE NO.: SYSTEM NO.: 239-1191-177

DATA ON FILE FOR THIS SURVEY

Location	X	Dissolved 02 / Temp. Profiles	X
Physical Data	X	Winter Dissolved 02 / Temp. Profiles	--
Bench Mark	X	Netting Record	X
Terrain Features	X	Lake Catch Summary	X
Access	X	Individual Fish Data	--
Resorts and Campsites	X	Fish Preserved	--
Other Developments	X	Stomach Analysis	X
Obstructions and Pollutions	X	Scale Reading	X
Special Restrictions	X	Location of Inventory Sites	X
Aquatic Plants	X	Photograph Directory	X
Wildlife Observations	X	Appendices	
Miscellaneous Comments	X	A: Water Chemistry Analysis	X
Lake Drainage	X	B: Tributary Stream Data	X
Fisheries Management Comments	X	C: Fish Scale Analysis	X
History of Previous Surveys -	X	Bathymetric Map Reduction	X
Water Chemistry Summary	X	Bathymetric Map	--

LOCATION

Location:	approximately 44 km southeast of Fort Ware		
Elevation:	750 m ± 10 m	U.T.M.:	10.368921.6331546
Latitude / Longitude:	57°06'31" 125°09'51"	N.T.S. Map No.:	94-F/3
Management Unit:	7-41	Biogeoclimatic Zone:	Boreal White & Black Spruce
Ecoprovince:	Northern Boreal Mountains	Ecoregion:	Northern Canadian Rocky Mountains
Ecosection:	Western Muskwa Ranges		

Drainage: Unnamed C. --> Truncate c. --> Finlay R. --> Williston Reservoir (Finlay Reach) --> Peace R.

PHYSICAL DATA

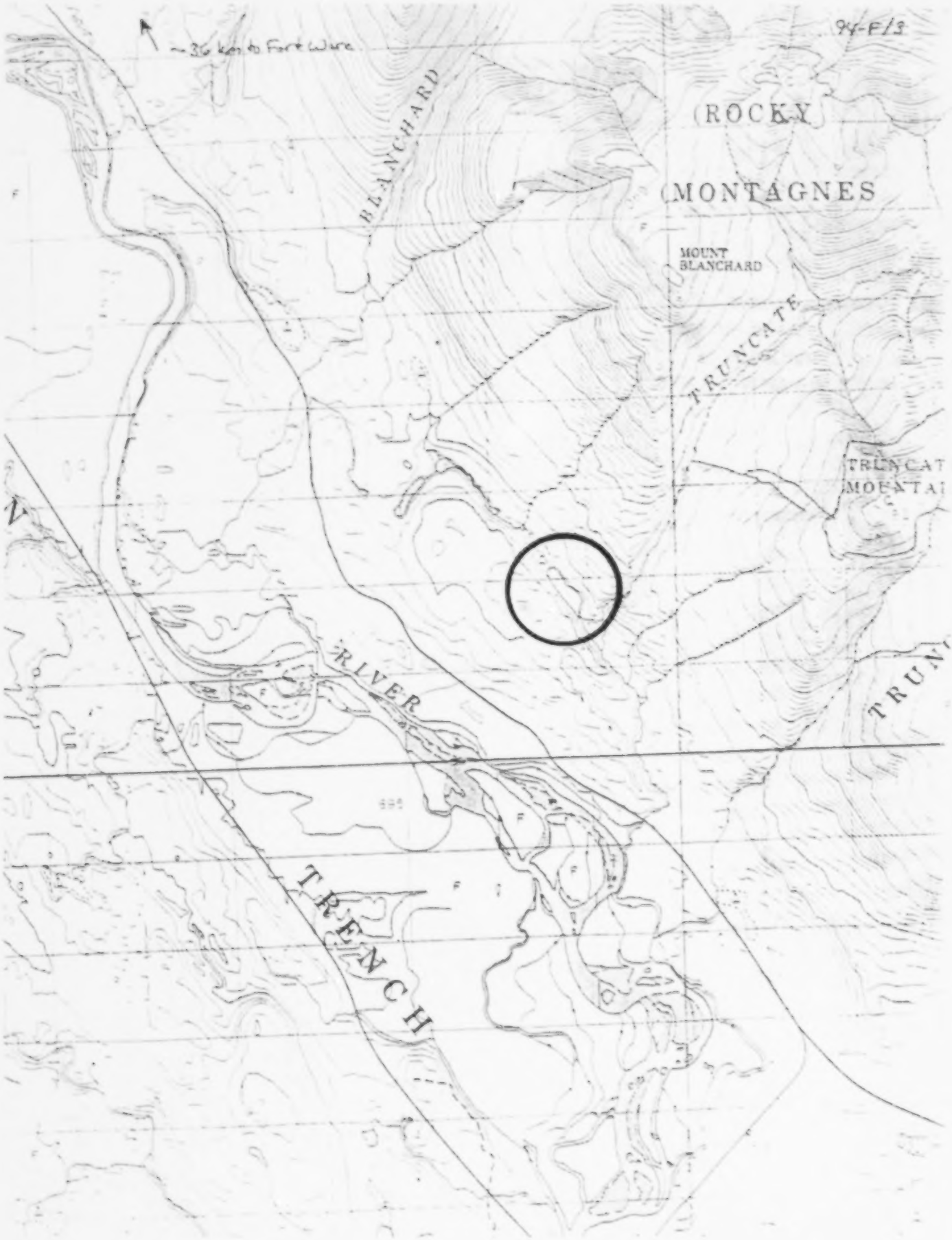
Lake Drainage Area:	8.8 km^2	Volume:	100 493 m^3
Water Surface Area:	116 169 m^2	Perimeter of Islands:	0 m
Area Above 6 m Contour:	116 169 m^2	Number of Islands:	0
Shoreline Perimeter:	2 676 m	Mean Depth:	0.9 m
Maximum Depth:	2.65 m	Secchi Reading:	2.3 m
Filterable Residue (TDS):	140 mg/L		

Sounding Device: Lowrance X-15 Elevation Source: Contour Interpolation

BENCHMARK

(Iron spike, center of red circle) located 2.0 m above present water level in a 46 cm diameter spruce tree that is 3.78 m from the present water's edge and located in the east corner of the lake approximately 300 m north of the outlet (Plate # 4).

High Water Mark: 0.3m above water level at time of survey


~36 km to Fort Ware
94-F/3
BLANCHARD
ROCKY
MONTAGNES
MOUNT
BLANCHARD
TRUNCATE
RIVER
TRENCH

LAKE: Unnamed Lake (Truncate Lake # 3)

TERRAIN FEATURES

Immediate Shoreline:

Truncate Lake # 3 is fronted along the sides of the lake by sedge grasses, with spruce trees, bunchberry, Labrador tea and trapper's tea growing behind on steep slopes. In the northwest and southeast ends, marsh areas dominate the shoreline. In the northwest marsh, scrub birch and willows grow back from the water's edge. In the southeast marsh, alders grow back from the water's edge.

The lake's bottom has a low slope towards the middle of the lake in front of the marsh areas and the substrate is mainly silts and organics. Along the sides of the lake, the bottom has a moderate steep slope, and the substrate is predominately organics over gravels with some large woody debris. A beaver hut was located approximately halfway along the southwest shore.

Surrounding Country:

Truncate Lake # 3 is surrounded by a mature forest of spruce trees with some paper birch and lodgepole pine trees mixed throughout. There is a steep hill to the southwest, with low hills behind that and the Finlay River located approximately 1.5 km away. To the northeast, steep hills rise away from the lake and give way to mountains. To the northwest and southeast, the terrain remains relatively flat past the marsh areas. An unnamed lake lies approximately 1.0 km to the northwest. Truncate Lake # 3 is situated within the Boreal White and Black Spruce biogeoclimatic zone.

LAKE: Unnamed Lake (Truncate Lake # 3)

ACCESS

Directions:

From the junction of Highway 97 and Highway 39, drive south on Highway 97 for approximately 1.5 km and turn right on to the Finlay Forest Service Road. Travel north for approximately 200 km to Mesilinka Camp, then continue on the Finlay-Chunamon Forest Service Road for approximately 105 km to the Ingenika Arm of Williston Reservoir. A barge must be taken across the Ingenika Arm. On the north side of the Ingenika Arm, drive north on the Finlay Forest Service Road for approximately 72.5 km. Turn left, and proceed for approximately 3.7 km to Buffalo Head Camp (Finbow Camp). The total distance from the junction of Highway 97 and Highway 39 to Buffalo Head Camp is approximately 382.7 km. Truncate Lake # 3 is approximately a 25 km helicopter ride to the southeast of Buffalo Head Camp.

Barge transportation can be arranged with Finlay Navigation Inc. who can be reached in Prince George at (250) 964-3525 and in Mackenzie at (250) 997-3525. Actual barge pick-up times may vary greatly from the predicted pick-up time.

Road Type and Conditions:

Highway 97 is a well-maintained, two-lane paved highway. The Finlay Forest Service Road, on both sides of the Ingenika Arm, and the Finlay-Chunamon Forest Service Road from 0 km to approximately 79 km (Factor Ross Creek), are well-maintained, two-lane gravel logging roads that can be easily traveled with a two-wheel drive truck. After approximately 79 km, the Finlay-Chunamon Forest Service Road becomes quite narrow and very windy. The road in to Buffalo Head Camp from the Finlay Forest Service Road is a well-maintained, two-lane gravel road.

Restrictions:

Although there are no restrictions, it is recommended that a truck radio be used to monitor for traffic, especially along the windy part of the Finlay-Chunamon Forest Service Road.

RESORTS AND CAMPSITES

There are no resorts or campsites on Truncate Lake # 3.

LAKE: Unnamed Lake (Truncate Lake # 3)

OTHER DEVELOPMENTS

None noted.

OBSTRUCTIONS AND POLLUTIONS

The lake is partially overgrown with yellow waterlilies (Nuphar sp.) and claspingleaf pondweed (Potamogeton richardsonii).

SPECIAL RESTRICTIONS

None noted.

AQUATIC PLANTS

The following aquatic plants were identified during the time of the survey:

yellow waterlily (Nuphar sp.)	waterweed (Anacharis sp.)
milfoil (Myriophyllum sp.)	eel grass
sedge grasses	claspingleaf pondweed (Potamogeton richardsonii)
small pondweed (Potamogeton pusillus)	

WILDLIFE OBSERVATIONS

The following wildlife or signs were seen during the time of the survey:

bull and cow moose	3 unidentified ducks
unidentified hawk	various songbirds

MISCELLANEOUS COMMENTS

1) The large amount of yellow waterlilies (Nuphar sp.) and claspingleaf pondweed (Potamogeton richardsonii) makes boating difficult in this lake because the vegetation is easily caught up in the propeller of the outboard.

2) Bathymetric map: The lake outline was drawn from an enlargement of air photo 30 BC 87092: No. 066, flown September 7, 1987.

LAKE: Unnamed Lake (Truncate Lake # 3)

LAKE DRAINAGE

General:

Truncate Lake # 3 is fed by two inlets, one in the northwest end and on the northeast side of the lake. The lake is drained to the southeast by an Unnamed Creek that flows for approximately 0.45 km to it's confluence with Truncate Creek. Truncate Creek flows for approximately 3.0 km to where it joins the Finlay River.

Major Systems:

There are no major systems.

Minor Systems:

Inlet # 1 - Unnamed Creek

Inlet # 1 enters Truncate Lake # 3 from the northwest through the marsh in that end of the lake (Plate # 5). The first 80 m of the creek is deep enough to be traveled in the motor boat with the outboard on shallow drive. Over the first 80 m of the creek, the wetted width narrows from 15 m at the mouth to 6 m. The substrate is composed of fines and organics. Approximately 80 m upstream of the lake, the channel becomes undefined and choked with sedge grasses. Approximately 180 m upstream of the lake, there is a 0.6 m high beaver dam that has some flow over the top, but probably not enough at the time of the survey to allow for upstream fish passage. Approximately 215 m upstream of Truncate Lake # 3, there is a second beaver dam that was 1.0 m high and probably not passable to upstream fish passage at the time of the survey due to the lack of sufficient flow over the top of the dam (Plate # 6). Behind this dam, there is a large pond with a beaver hut in the middle of it. Six small, unidentified minnows were seen in the pond at the time of the survey. The water temperature of Inlet # 1 was 14 °C at the time of the survey. Inlet # 1 had no fisheries potential during the survey period.

Inlet # 2 - Unnamed Creek

Inlet # 2 enters Truncate Lake # 3 in the middle of the northeast shoreline, almost directly across from the beaver hut. The channel flows through sedge grasses for the first 4 m, then the channel becomes better defined. Approximately 5 m upstream of the lake, the channel goes underground for 2 m, then resurfaces. Upstream of 15 m from the lake, the creek is composed of small pools and falls connected by underground flow. Approximately 50 m upstream of Truncate Lake # 3, the channel goes underground permanently. In the areas where there is surface flow, the average wetted width is 0.25 m and the depth is 0.05 m. The substrate is comprised of fines and small gravels, and the

banks of the creek are made of mosses and Equisetum. The water temperature was 7 °C at the time of the survey. Inlet # 2 had no fisheries potential during the survey period.

Outlet - Unnamed Creek

The outlet drains Truncate Lake # 3 from the southeast end of the lake (Plate # 7) over a 1.25 m high beaver dam located at the lake's edge (Plate # 8). There was not enough flow over the top of the dam at the time of the survey to allow for upstream fish passage. The first 35 m downstream of the lake has an average wetted width of 12 m and depth of 0.5 m; about half of the channel, on the outside edges, is overgrown with sedge grasses. From approximately 35 m to 70 m downstream of the lake, the average wetted width and depth are the same, but the sedge grasses are confined more to the edges to the creek. Approximately 70 m downstream of Truncate Lake # 3, there is a 1.0 m high beaver dam that was probably not passable to upstream movement of fish at the time of the survey due to low flows over the top of the dam. Upstream of this dam the substrate is composed of fines and organics; downstream of the dam, the substrate is fines and gravels. Approximately 95 m downstream of the lake, there is a third beaver dam that is 0.35 m high that is partially blown out on the right side. Downstream of this dam, the creek becomes heavily overgrown with alders for 40 m. Approximately 135 m downstream of the lake, the alder growth opens up at ground level, but still retains a thick canopy (70% crown closure). The outlet had some limited salmonid spawning habitat during the survey period.

A Stream Survey card was completed for a sample site located approximately 150 m downstream of Truncate Lake # 3 (Plate # 9 & # 10). The average wetted width is 3.5 m and the average maximum riffle depth is 0.2 m. The substrate is composed of fines (50%), gravels (45%) and small cobble (5%). The creek morphology is mainly riffles (60%) and runs (35%) with a gradient of 2.5%. The water temperature was 17 °C at the time of the survey. Good cover was provided by the crown closure (70%). For additional information, refer to Appendix B.

LAKE: Unnamed Lake (Truncate Lake # 3)

FISHERIES MANAGEMENT COMMENTS

Although shallow, Truncate Lake # 3 had a good population of rainbow trout. One experimental monofilament gill net and four Gee minnow traps set for five hours caught 44 rainbow trout, one bull trout and 146 lake chub. Warm water conditions and a large amount of aquatic vegetation could contribute to a large amount of aquatic insects and plankton, which in turn may account for the size that some of the rainbow trout have achieved (approximately 40 cm). This lake should be given special consideration if logging should occur near to it as there was a bull trout caught in the net set. A trail could be established from the Finlay Forest Service Road that lies to the southwest of the lake; however, there is no good location for a Forest Recreation Site due to the terrain either being steep or low, wetlands. It may be interesting to take a winter oxygen / temperature profile for this lake to determine the oxygen levels in the lake over the winter months. This lake could be subject to winter kill because it is shallow (2.6 m maximum depth). If this is the case, then the fish that inhabit the lake may over winter in a different location. Although the surrounding country is pleasing to the eye, the lake is overgrown with aquatic plants that detracts from the overall aesthetic quality.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

None known.

Other Related Studies:

None known.

LAKE: Unnamed Lake (Truncate Lake # 3)

WATER CHEMISTRY SUMMARY **Limnology Station No. 1**

Field Conditions:

Date:	August 8, 1996		
Time:	1220 hrs	Air Temperature:	17.0 °C
Wind Velocity:	10 - 15 km/h	Wind Direction:	from the E
Cloud Cover:	8 / 10 o.c.	Surface Conditions:	rippled
Secchi Disc:	2.3 m	Water Colour:	cloudy with yellow-brown colour

Method Used:

Dissolved Oxygen:	YSI Model 57 Oxygen / Temperature Meter
Water Temperature:	YSI Model 57 Oxygen / Temperature Meter
Air Temperature:	Hand-Held Alcohol Thermometer
pH (field):	Digital pH Pocket Tester
H2S (field):	Hach H2S Field Test Kit
Laboratory Used:	Pacific Environmental Science Center
Water Sampler:	Vertical Alpha Water Bottle (Vandorn)
Metal Sampler:	By Hand; Preserved With 2.0 mL Nitric Acid
Substrate Sampler:	Substrate Sample Not Taken

Water Sample Chemistry: **SEAM Site No.:** E 223175

	Sampling Depths	
	Surface (0.5 m)	Lower (2.0 m)
Alkalinity (lab)	131 mg / L	131 mg/L
Filterable Residue 105°C (lab)	140 mg / L	160 mg / L
H2S (field)	N/A	0.0 mg / L
Nitrogen - Total (lab)	0.45 mg / L	0.4 mg / L
Non-Filterable Residue (lab)	< 5 mg / L	< 5 mg / L
pH (field)	8.1	7.8
pH (lab)	8.12	8.02
Phosphorus - Total Dissolved (lab)	0.006 mg / L	0.007mg / L
Specific Conductance (lab)	243 µS / cm	244 µS / cm

Bottom Depth: 2.65 m

Substrate Sample Depth: N/A

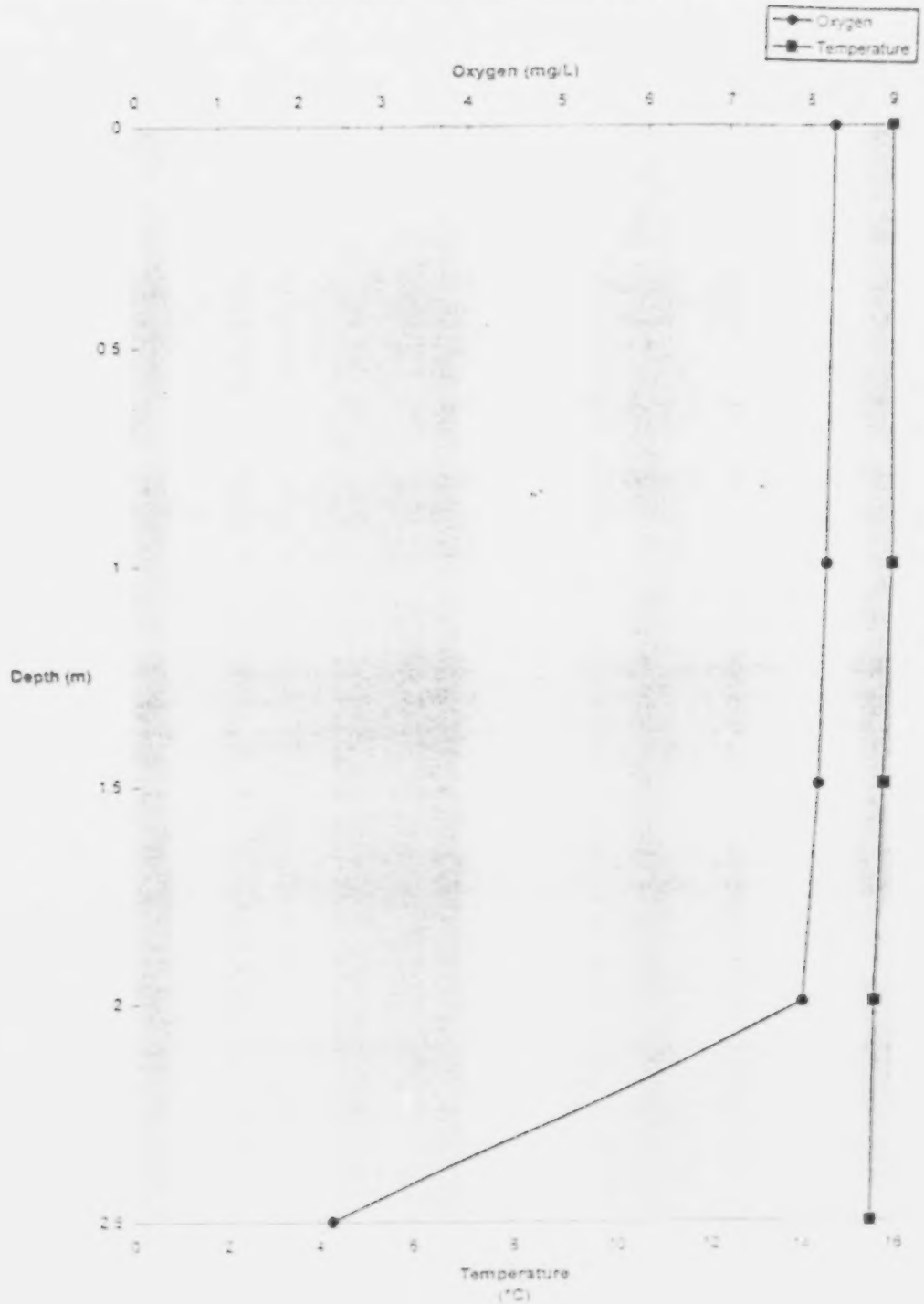
* additional analyzed parameters and results, including metals, are found in Appendix 1

LAKE: Unnamed Lake (Truncate Lake # 3)

SUMMER OXYGEN / TEMPERATURE DATA

DEPTH (in)	02 (mg/L)	TEMPERATURE (°C)
Surface	8.3	16.0
1.0	8.2	16.0
1.5	8.1	15.8
2.0	7.9	15.6
2.5	2.4	15.5
2.65	Bottom	

SUMMER OXYGEN / TEMPERATURE PROFILE



LAKE: Unnamed Lake (Truncate Lake # 3)

NETTING RECORD

Mesh Size Experimental Order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 1

Type:	Sinking Monofilament Gill Net			
Date Set:	August 8, 1996		Time:	1200 hrs
Date Lifted:	August 8, 1996		Time:	1650 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	1.5 m
			Substrate:	organics over gravels
Deep End Mesh Size:	64 mm		Depth:	2.2 m
			Substrate:	organics and aquatic plants

Comments: The net started approximately 4 m from the shore. Four rainbow trout escaped while the net was being pulled.

LAKE CATCH SUMMARY

Species	Netting Site No. 1	Angled	Other	Total	Number Sampled	Number Preserved	Size Range (cm)
RB	44	0	0	44	30	0	12.1-39.2
BT	1	0	0	1	1	0	22.0

Minnow Traps:

Bait: Sardines

Trap No.	Hours	Depth (m)	Substrate	Species	No. Caught	Size Range (cm)
1	5:15	1.0	eel grass over organics	LKC leech	6 3	6.5-8.9
2	5:16	0.8	sedge grass over organics	LKC	110	4.4-8.8
3	5:17	1.2	organics and woody debris	leech	2	
4	5:17	1.0	organics and woody debris	LKC leech	30	6.3-9.6

LAKE: Unnamed Lake (Truncate Lake # 3)

INDIVIDUAL FISH DATA

Date Captured: August 8, 1996

Method: Sinking Monofilament Gillnet

M - Male
F - Female
? - Not Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
FR - Fin Ray
HD - Head
ML - Milt
OT - Otolith
SC - Scale

Species	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Stomach Contents: Plankton	Insects	Fish	Other	Comments
RB	12.1	16	M	IMM	SC	1+	Da	M			cysts on St.
RB	24.0	174	M	MG	SC	2+	Da, G				
RB	23.5	163	M	IMM	SC	2+	Da	B, M			
RB	35.4	618	M	MG	SC	2+				L	
RB	39.2	732	M	MG	SC	3+		DN			
RB	25.3	229	M	MG	SC	2+				L	
RB	22.5	177	M	MG	SC	2+	Da				
RB	16.0	53	M	IMM	SC	1+	Da	M			
RB	29.8	354	M	MG	SC	2+	Da	M		O	
RB	18.5	81	F	IMM	SC	1+	Da	M			
RB	24.3	202	M	MG	SC	2+	Da	DN			
RB	17.3	64	M	MG	SC	1+		Dam			
RB	26.9	269	M	MG	SC	3+		DN			
RB	12.8	22	M	IMM	SC	2+	Da				
RB	17.8	78	F	IMM	SC	**	Da				
RB	12.5	22	M	IMM	SC	2+		DN, Dam			
RB	25.9	181	F	MG	SC	2+	Da	DN, Dam		S	
RB	22.8	169	M	MG	SC	2+	Da	CF			
RB	21.4	140	M	MG	SC	1+	Da	M			
RB	14.9	37	M	IMM	SC	1+		M			
RB	17.5	71	M	MG	SC	1+	Da	M			
RB	24.2	205	M	MG	SC	2+		DN			
RB	18.7	94	M	IMM	SC	1+	Da	Dam			
RB	20.0	103	F	IMM	SC	1+	Da	CF			
RB	22.5	164	M	MG	SC	2+	Da	B, DN			
RB	26.0	242	M	MG	SC	2+			fish		
RB	17.7	73	M	MG	SC	1+	Da	B, Dam			
RB	13.4	31	M	IMM	SC	1+	Da				
RB	21.9	132	F	MG	SC	2+	Da	B, M			
RB	21.0	128	F	IMM	SC	2+		Dam			
BT	22.0	102	M	IMM	FR	3			fish		

B - Beetle
C - Clams
CF - Caddis Fly
Da - *Daphnia*
Dam - Damsel Fly
Di - Diptera
DN - Dragonfly Nymph
G - *Gammerus*
L - Leech
Li - Lice
M - Mosquito
O - Organics
S - Snail
St - Stomach
WB - Water Boatman
WF - Whole Fish

** scale had regenerated - not able to age

LOCATION OF INVENTORY SITES
Benchmark
Stream Number And Direction Of Flow
NS
Net Set Number And Site
LS
Limnostation Number And Site
Plate Number And Direction Of Photograph
10
8
2
3
LS 1
2
NS 1
9
10

LAKE: Unnamed Lake (Truncate Lake # 3)

Plate	Roll : Number	Description
1	14:2	Aerial view of Unnamed Lake (Truncate Lake # 3) looking northwest.
2	13: 2 - 4	Panoramic view of Unnamed Lake (Truncate Lake # 3) looking southeast from the center of the lake.
3	13:1, 14:23-24	Panoramic view of Unnamed Lake (Truncate Lake # 3) looking northwest from the center of the lake.
4	14: 22	View of the benchmark located 2.0 m above present water level in a 46 cm diameter spruce tree that is 3.78 m from the present water's edge and located in the east corner of the lake approximately 300 m north of the outlet.
5	13: 7	View of the mouth of Inlet # 1 where it enters Unnamed Lake (Truncate Lake # 1) in the northwest end of the lake.
6	13: 13	Upstream view of beaver dam # 2 on Inlet # 1, located approximately 215 m upstream of Unnamed Lake (Truncate Lake # 3). Dam height is 1.0 m.
7	14: 21	View of the mouth of the outlet where it drains Unnamed Lake (Truncate Lake # 3) from the southeast end of the lake.
8	14: 20	Upstream view of beaver dam # 1 on the outlet, located at the edge of Unnamed Lake (Truncate Lake # 3). Dam height is 1.25 m.
9	14: 16	Upstream view of the sample site on the outlet, taken approximately 160 m downstream of Unnamed Lake (Truncate Lake # 3).
10	14: 15	Downstream view of the sample site on the outlet, taken approximately 140 m downstream of Unnamed Lake (Truncate Lake # 3).

LAKE: Unnamed Lake (Truncate Lake # 3)

Plate # 1: Aerial view of Unnamed Lake (Truncate Lake # 3) looking northwest.

LAKE: Unnamed Lake (Truncate Lake # 3)

Plate # 2: Panoramic view of Unnamed Lake (Truncate Lake # 3) looking southeast from the center of the lake

LAKE: Unnamed Lake (Truncate Lake # 3)

Plate # 3: Panoramic view of Unnamed Lake (Truncate Lake # 3) looking northwest from the center of the lake

LAKE: Unnamed Lake (Truncate Lake # 3)

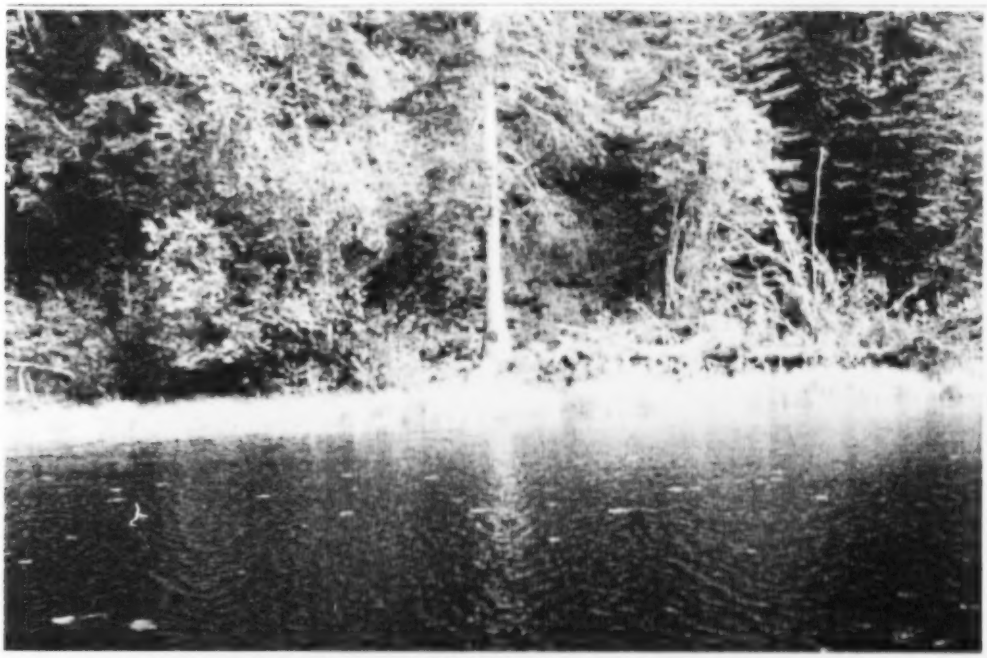


Plate # 4: View of the benchmark located 2.0 m above present water level in a 46 cm diameter spruce tree that is 3.78 m from the present water's edge and located in the east corner of the lake approximately 300 m north of the outlet.

Plate # 5: View of the mouth of Inlet # 2 where it enters Unnamed Lake (Truncate Lake # 3) in the northwest end of the lake.

LAKE: Unnamed Lake (Truncate Lake # 3)

Plate # 6: Upstream view of beaver dam # 2 on Inlet # 1, located approximately 215 m upstream of Unnamed Lake (Truncate Lake # 3).

Plate # 7: View of the mouth of the outlet where it drains Unnamed Lake (Truncate Lake # 3) from the southeast end of the lake.

LAKE: Unnamed Lake (Truncate Lake # 3)

Plate # 8: Upstream view of beaver dam # 1 on the outlet, located at the edge of Unnamed Lake (Truncate Lake # 3). Dam height is 1.25 m.

Plate # 9: Upstream view of the sample site on the outlet, taken approximately 100 m downstream of Unnamed Lake (Truncate Lake # 3).

LAKE: Unnamed Lake (Truncate Lake # 3)

Plate # 10: Downstream view of the sample site on the outlet, taken approximately 140 m downstream of Unnamed Lake (Truncate Lake # 3).

Appendix A

LABORATORY REPORT

Water Chemistry Analysis

RESULTS FOR UNNAMED LAKE-TRUNCATE LAKE #3 SAMPLES

Parameter Analyzed		Units	963802-001	963802-002
ALKALINITY		mg/l	131	131
CONDUCTIVITY		uS/cm	243	244
METALS/TOTAL (WATER-ICP)	AG	mg/l	<.01	-
	AL	mg/l	.06	-
	AS	mg/l	<.06	-
	B	mg/l	<.01	-
	BA	mg/l	.072	-
	BE	mg/l	.001	-
	CA	mg/l	43.1	-
	CD	mg/l	<.006	-
	CO	mg/l	<.006	-
	CR	mg/l	<.006	-
	CU	mg/l	<.006	-
	FE	mg/l	.365	-
	K	mg/l	.5	-
	MG	mg/l	8.6	-
	MN	mg/l	.015	-
	MO	mg/l	<.01	-
	NA	mg/l	2.7	-
	NI	mg/l	<.02	-
	P	mg/l	<.1	-
	PB	mg/l	<.06	-
	SB	mg/l	<.06	-
	SE	mg/l	<.06	-
	SI	mg/l	2.31	-
	SN	mg/l	<.06	-
	SR	mg/l	.125	-
	TI	mg/l	.004	-
	V	mg/l	<.01	-
	ZN	mg/l	.008	-
NITROGEN/AMMONIA		mg/l	.043	.039
/NITRITE		mg/l	.002	.002
/NITRITE+NITRATE		mg/l	<.002	<.002
/TOTAL		mg/l	.45	.4
PH		Rel.U.	8.12	8.02
PHOSPHORUS/O-PO4		mg/l	<.001	<.001
/TOTAL		mg/l	.011	.016
/TOTAL DISSOLVED		mg/l	.006	.007
RESIDUE/FILTERABLE		mg/l	140	160
/NON-FILTERABLE		mg/l	<5	<5
BC CLIENT STUDY CODE			20	20
SAMPLING AGENCY			91	91
SITE IDENTIFIER/NUMBER			E223175	E223175
COLLECTION START DATE		y/m/d	96/08/08	96/08/08
UPPER DEPTH		METERS	0.5	2.0
TEMPERATURE ON ARRIVAL		deg.C	8	8

Appendix B

Tributary Stream Data

D.F.O. / M.O.E. Stream Survey Form

DFO / MOE

STREAM SURVEY FORM

Stream Name: Unnamed Ck. Tributary To: Unnamed Ck (Tributary to Fraser Lk #2)

Watershed Code:

Location: ~1/2 - 3/4 of Unnamed Ck (Tributary to Fraser Lk #2)

Date: YR 96 MO 07 DA 08 Time: 1320 Agency: Observer: Mill / Kim

Access: Legal 2, Longitude 20, Map 94-F/5, UTM, Photos, Air Photos, Method

C	PARAMETER	VALUE	METH	SPECIFIC DATA	OBSTRUCTIONS C	Type	Loc
	Ave Chan. Width (m)	6.7	ST	1.30 3.0 5.8 4.7			
	Ave Wet Width (m)	3.5	ST	4.5 2.8 2.4 4.2			
	Ave Max Riffle Depth (cm)	20	cm	16 20 22			
	Ave Max Pool Depth (cm)	40	cm	42			
	Gradient %	2.5	SC				
	% Pool Stable	60 Pool Type	GE				
	Side Channel		GE				
	% Area Obstr. / Debris		GE				
	Bank Stability %	20	GE				
	COVER Total %	20	GE				

BED MATERIAL

		%
Fines	silt, sand (<2mm)	50
Small	(2-16mm)	30
Large	(16-64mm)	15
Small Cobble	(64-128mm)	5
Large Cobble	(128-256mm)	0
Boulder	(>256mm)	0
Bedrock (Al)		0

Unembedded %, Consolidation L (M) H

BANKS

1	Height (m) 0.2	Angle 60			
	Texture F (M) L R				
	Comment: EN CO FC OC (VC) N/A				
	Valley / Channel Ratio: 1-2 2-5 5-10 (10+) N/A				
	Dry L (M) H Flood				
	Flood Sight. (m/m) 0.5 Grazing Y (N)				
	Class (1-5) 5 Int. Length				
	Reach Length (m) 15 Total Length				

Cover Layers

Camp Sum.	Deciduous	Low	Shrubs	Over veg	Conifers
100%	0	45	0	0	5

Other Algae % 20 Access SC Undercut G Consolidation L (M) H

DISCHARGE

Parameter	Value	Metric	Survey Data
Wetted Width (m)	3.5	ST	3.5 3.6 3.5
Mean Depth (m)	0.1	Cm	0.2, 0.1, 0.0, 0.10 0.2 0.2
Mean Velocity (m/s)	0.5	FM	0.2, 0.6, 0.7, 1.0, 0.5, 0.5, 0.5, 0.5, 0.5
Discharge (m³/s)	0.13	FM	

REACH SYMBOL

Fish

Width, Veloc, Channel Slope, Bed Material

FISH SUMMARY

C	Species	No	Size Range (mm)	Life Phase	Use	Method/Ref.

STREAM VALLEY CROSS-SECTION

Looking Downstream

L R

PLANIMETRIC VIEW

COMMENTS

Channel Stability, Debris, Management Concerns, Obstructions, Riparian Zone, Valley Wall Processes, Etc.

1 Fair - Small gravel, [illegible] with [illegible]

Appendix C

FISH SCALE ANALYSIS

Rainbow Trout Age Determination Completed By:

A.M.C. Technical Services Ltd.
Melinda M. Hirst
6809 Phillip Road.
Lantzville, B.C.
VOR 2H0

Bull Trout Age Determination Completed By:

North / South Consultants Inc.
202-1475 Chevrier Blvd.
Winnipeg, Manitoba
R3T 1Y7

SEE ORIGINAL COPY

FOR SCALE SAMPLE READINGS

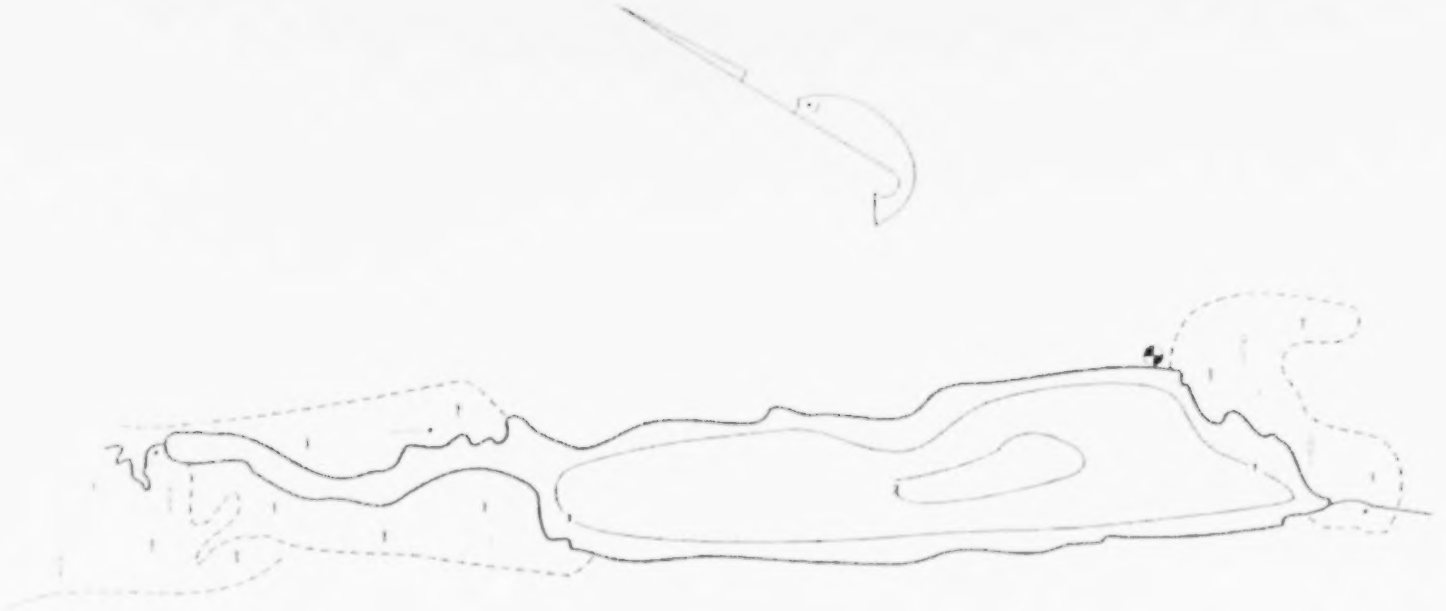
ORIGINAL COPY IS HELD BY

B. C. MINISTRY OF ENVIRONMENT, LANDS AND PARKS

PRINCE GEORGE, B. C.

Appendix D

BATHYMETRIC MAP



Reduced to
34%
of Original Size

STATISTICS AT TIME OF SURVEY

Elevation	336	m. ?
Surface Area	116169	sq.m
Area above soc. contour	116169	sq.m
Volume	106971	cu.m
Mean Depth	0.9	m
Maximum Depth	2.1	m
Perimeter Mean Shore	1635	m
Perimeter Islands	0	m
Bench Mark	2.0	m

Truncate Lake # 3